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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,015	12/08/2003	Nobuo Komeyama	K06-163809M/TBS	9139

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EXAMINER

BINDA, GREGORY JOHN

ART UNIT PAPER NUMBER

3679

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/729,015

Applicant(s)

KOMEYAMA ET AL.

Examiner

Greg Binda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005 and 24 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-18 and 20 is/are rejected.
- 7) ☒ Claim(s) 14 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on various is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. The indicated allowability of claims 10-13, 16 & 17 is withdrawn in view of the newly discovered reference to Kosuda et al, US 4,445,875 (Kosuda). Rejections based on the newly cited reference follow.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed October 24, 2005 in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 22, 2005 has been entered.

Drawings

4. The drawings are objected to because Figs. 2 & 6 fail to show the thrust bearings 7.

On page 16 of the amendment filed September 22, 2005, applicant argues that Figs. 2 & 6 need not show the thrust bearings 7 because the thrust bearings are already shown in Fig. 1. However, each of Figs. 2 & 6 is a view of a cross section of a universal joint, a cross section that would reveal the thrust bearings. Therefore Figs. 2 & 6 must each show the thrust bearings regardless of what is shown or not shown in another figure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) in order to correct the directional errors in the amendment filed Sep. 22, 2005. See where the amendment directs the brief description of Fig. 8 to be inserted in the summary.

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that

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double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

6. The disclosure is objected to because:

- a. Page 2, lines 21 & 22 includes the nonsensical sentence, "This is a room for further improvement."
- b. The brief description of the drawings fails to mention Fig. 8.

Claim Rejections - 35 USC § 102

7. Claim 18 is rejected under 35 U.S.C. 102(b) as being anticipated by Armasow et al, US 4,144,724 (Armasow). Fig. 4 shows a cross shaft comprising: a trunnion 44; a roller bearing externally provided on the trunnion comprising rollers 45, 46a, 46 arranged in a plurality of rows in parallel in an axial direction of the trunnion; and a plurality of bearing rolling faces (see also "progressively narrowed steps" in col. 6, line 8) corresponding to the plurality of rows of rollers provided on an outer peripheral face of the trunnion, the plurality of bearing rolling faces being reduced in diameter from the root of the trunnion toward the distal end of the trunnion. Fig. 4 shows the radial clearance between the rollers 45, 46a, 46 and the rolling faces increases from

the root of the trunnion 44 towards the distal end of the trunnion. Fig. 4 shows all of the rollers 45, 46a, 46 have the same diameter.

Claim Rejections - 35 USC § 103

8. Claims 1, 3, 5, 7-9, 15 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petrzelka et al, US 4,371,357 (Petrzelka) in view of Kosuda.

a. Claim 1. Petrzelka shows in Fig. 2, a cross shaft 9 comprising: a trunnion 11; a roller bearing 10 externally provided at the trunnion; and a recess 16 formed at a distal end face 13 of the trunnion, wherein the recess gradually increases toward an opening end of the recess. Petrzelka does not expressly disclose making the bottom portion of the recess 16 spherical. Kosuda shows a cross shaft trunnion 4 with a recess 10 having a spherical (see also “hemispherical” in col. 2, line 49) bottom portion. In col. 3., lines 1+, Kosuda teaches making the cross shaft trunnion with this type of recess in order to provide optimum lubrication. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cross shaft of Petrzelka by making the recess 16 with a spherical bottom portion like that of Kosuda in order to provide optimum lubrication as taught by Kosuda.

b. Claim 3. Petrzelka shows in Fig. 2 that the opening of the recess 16 has a diameter that is from about 50 to 80% of the outer diameter of the trunnion 11.

c. Claim 5. Petrzelka shows in Figs. 1 & 2 that the cross shaft 9 comprises four trunnions 11 and four roller bearings 10 respectively mounted on the four trunnions.

d. Claims 7-9. The spherical bottom portion of the recess 10 in Kosuda is shown as including an arc of 120 to 160 degrees and having a radius of curvature that is half of the opening diameter of the recess. The recess 10 is shown as being 30 to 70% of the length of the respective roller bearing 6.

e. Claim 15. Petrzeka discloses the opening of the recess 16 is conical which means the opening comprises a curved shape since a cone is round. Fig. 2 in Petrzeka shows the diameter of this conical section increases towards the opening end of the recess 16.

f. Claim 20. Petrzeka shows the opening of the recess 16 is tapered.

9. Claims 2, 4, 6, 10-13, 16 & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petrzeka in view of Kosuda as applied to claim 1 above, and further in view of Olschewski et al, US 4,436,516 (Olschewski).

a. Claim 2. The combination of Petrzeka and Kosuda includes all the limitations of the claim except the outer periphery of the trunnion provided with a plurality of bearing faces which are successively reduced in diameter. In Fig. 1, Olschewski shows a trunnion 6 like that in the combination, but in Fig. 3 shows the trunnion modified so that it includes a plurality of bearing faces which are successively reduced in diameter. Olschewski teaches in col. 3, lines 1-10, providing such modification in order to eliminate deleterious end pressures. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Petrzeka and Kosuda by making the trunnion with a plurality of bearing faces which are successively reduced in diameter in order to eliminate deleterious end pressures as taught by Olschewski.

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- b. Claim 4. Although Petrzelka does not expressly disclose making the cross shaft 9 from carburized steel, it would have been obvious to one of ordinary skill in the art at the time of the invention to do so since it is well known in the art to use carburized steel in the making of cross shafts. See *SAE Universal Joint and Driveshaft Design Manual*, page 71, third paragraph of the section titled "Material Selection".
- c. Claim 6. Olschewski shows the roller bearing comprises rollers arranged in a plurality of rows. (Note, making the rollers with curved endings is well known in the art. See Fig. 60 on page 64 of *SAE Universal Joint and Driveshaft Design Manual*.)
- d. Claim 10. A cross joint comprising all the limitations of the claim is obvious in view of the combination of Petrzelka, Kosuda and Olschewski as noted in items 8a, 8f & 9a above.
- e. Claims 11-13. A cross joint comprising all the limitations of the claims is obvious in view of the combination of Petrzelka, Kosuda and Olschewski as noted in item 8d above.
- f. Claim 16. Olschewski shows a difference in the outer diameters of the adjacent rolling faces, but does not expressly disclose the difference in the range of 0.1 to 0.5% of the diameter of the rollers. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the difference in outer diameters of the rolling faces between of 0.1 to 0.5% of the diameter of the rollers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056.

- g. Claim 17. Olschewski shows the radial clearance between the rollers and the rolling faces is increased from the root of the trunnion toward the distal end of the trunnion.

Allowable Subject Matter

10. Claims 14 & 19 are each objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- a. Claim 14. Allowable material is indicated because Petrzelka expressly discloses in col. 4, lines 1-4 that the angle of the tapered shape is not in the range of 10 to 30 degrees.
- b. Claim 19. Allowable material is indicated because neither Olschewski nor Armasow shows or suggests the limitations of the claim.
 - i. Olschewski does not show or suggest the rollers 10 & 11 having the same diameter.
 - ii. In Fig. 4 Armasow shows the difference in the outer diameters of the adjacent rolling faces is clearly greater than 0.5% of the diameter of the rollers.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *SAE Universal Joint and Driveshaft Design Manual*, page 71, third paragraph of the section titled "Material Selection" discloses that universal joint cross shafts are typically made from carburized steel.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Greg Binda whose telephone number is (571) 272-7077. The examiner can normally be reached on M-F 9:30 am to 7:00 pm with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on (571) 272-7087. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Greg Binda
Primary Examiner
Art Unit 3679